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U.S. Army Aviator Job Analysis

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14. ABSTRACT *(Maximum 200 words)*:

This report describes the job analysis performed by The U.S. Army Research Institute for the Behavioral and Social Sciences Rotary Wing Aviation Research Unit (ARI RWARU). It was part of a larger research project to develop and validate a selection system for U.S. Army rotary wing aviators, called Selection Instrument for Flight Training (SIFT). The activities performed by Army aviators and the personal attributes required to perform those activities were examined. This job analysis helped identify predictor measures subsequently used to validate the prototype SIFT test battery.

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Aviator selection; selection; military; job analysis; job inventory

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U.S. Army Aviator Job Analysis

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U.S. ARMY AVIATOR JOB ANALYSIS

EXECUTIVE SUMMARY

Research Requirement:

The current test for selection into Army flight school is the Alternate Flight Aptitude Selection Test (AFAST). Since it was first developed in 1988, the AFAST has been scrutinized for deficiencies, including minimal predictive validity and operational support, past expropriation of testing materials, general limitations of paper and pencil testing, a less-than-optimal selection strategy, and the possibility that it may not be measuring the correct set of attributes given the considerable change in aviator requirements and in the applicant population. In June of 2004, this scrutiny prompted the Army to seek to replace the AFAST with a computer-administered test for Army flight training with emphasis on aptitudes required for Future Force aviator performance within the Future Combat Systems environment. Thus, a critical task in this project was to conduct a job analysis for Army aviators to collect information regarding the personal attributes that should be required of flight school candidates.

Procedure:

There are a variety of approaches to conducting job analyses. The job inventory approach is one of the most widely used and was chosen as most appropriate for the present research. To begin this process, information concerning requirements of the Army aviator job was collected from available sources (e.g., job descriptions, training materials, subject matter expert [SME] interviews). The next step was to use this information to construct lists of all tasks believed to be relevant for the Army aviator position. These preliminary task lists were reviewed by small groups of job incumbents to ensure that they were comprehensive and relevant. Based on these meetings with SME groups, a final listing of tasks and activities was developed. This final task list, or Job Analysis Questionnaire (JAQ), was then used to collect systematic, job descriptive information from representative samples of Army aviators. The incumbents were asked to rate each task or activity regarding how critical or important the performance of that task or activity would be to successful job performance.

Findings:

Tasks related to emergency procedures and safety received the highest importance ratings across all airframes. Specifically, with respect to knowledge, skills, abilities, and other personal characteristics (KSAOs), *Situational Awareness*, *Operation and Maneuvering of Helicopter*, *Psychomotor Ability*, *Information Processing*, and *Decision Making* received the highest importance ratings.

Utilization and Dissemination of Findings:

The JAQ survey provided information about the tasks and attributes that are important for success as an Army aviator. In addition, this analysis explored the manner in which the tasks, and the KSAOs required to perform those tasks, may vary depending upon airframe. The results of this report were used to help identify predictor measures for the SIFT project.

Based on the KSAOs receiving the highest ratings across all platforms, the recommended selection strategy is a two-stage testing process. The first stage of testing would measure cognitive and personality/motivational traits important for the aviator job. The US Navy currently uses a pilot selection test battery that measures cognitive abilities important for US Army aviators, and this battery can be adopted for Army aviator selection. The US Army also possesses two non-cognitive inventories, the Assessment of Individual Motivation (AIM) and the Test of Adaptive Personality (TAP), that can be adapted for use with the Army aviator applicant population. The second stage of the test battery would include performance-based measures of psychomotor and information processing skills. These tests require non-standard computer peripherals and may better serve the needs of Army aviation as classification instruments, for tracking selected aviators into one of the four mission platforms. Finally, a small number of new ability tests and non-cognitive scales can be developed to measure abilities or traits that are not currently measured by any of the readily-accessible test batteries or non-cognitive instruments.

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U. S. ARMY AVIATOR JOB ANALYSIS

Introduction

The selection test for Army flight school is the Alternate Flight Aptitude Selection Test (AFAST), which has been in service since 1988. Over its operational life the predictive validity of AFAST has declined, as is expected with static tests. Analyses have revealed six deficiencies in AFAST: minimal predictive validity, compromised security, incorrect testing strategy, incorrect attribute set, minimal operational support, and general limitations of paper and pencil testing. In June of 2004 the Army initiated replacement of AFAST through development of a computer-based, web administered test battery with emphasis on aptitudes required for current aviator performance. To uncover what those aptitudes might be, the activities performed by aviators were analyzed and the personal attributes required to perform those activities were examined.

Overview of the Job Inventory Approach

There are a variety of approaches to conducting job analyses. The job inventory approach is one of the most widely used, and was chosen as most appropriate for the present research (see Levine, Ash, Hall, & Sistrunk, 1983 for a review of the issues in choosing among alternative job analysis approaches). To provide a context for understanding this type of analysis, the steps involved in conducting a task inventory-based job analysis are briefly described below.

To begin this process, job analysts typically collect information concerning the targeted job from available sources (e.g., job descriptions, training materials, subject matter expert [SME] interviews). The next step is to use this information to construct lists of all of the tasks judged relevant for the position in question. These preliminary task lists are usually reviewed by small groups of SMEs (e.g., job incumbents) to ensure that they are comprehensive and relevant. Based on these meetings with SMEs, a final listing of tasks and activities is then developed.
Once this final task list has been developed, it is used to collect systematic, job descriptive information from representative samples of job incumbents. One key decision at this stage is the type of rating scales these incumbents are asked to use. Incumbents are typically asked to make some type of rating regarding whether a specific task or activity is indeed part of their job, and, if so, to then make a rating regarding how critical or important successful performance of each task or activity is to performance on the job. This provides an excellent starting point for a variety of organizational planning and human resources applications, including for designing and validating selection systems.

Development and Administration of the Job Analysis Questionnaire (JAQ)

This section describes the development and administration of the job analysis questionnaire (JAQ). The purpose of the questionnaire was to document the job of Army rotary wing aviator with a specific focus on what trainees were expected to learn during flight school. The JAQ development consisted of four primary steps: 1) to conduct a review of relevant literature and job analysis materials; 2) to create a draft task and knowledge, skill, ability, and

other personal characteristics (KSAOs) list based on these materials; 3) to conduct workshops with SMEs who would review the materials and suggest revisions, and; 4) to create the JAQ.

JAQ Development

The first step in JAQ development was to review all available relevant literature and job analysis information. (Appendix A contains the list of sources and references used in this review.) From this review, a master list of all tasks and KSAOs that might be related to rotary wing aviation was generated. The task and KSAO statements in the list were modified to eliminate redundancies and increase comprehensiveness. The initial list was designed to be as inclusive as possible, so that no potentially relevant information would be omitted.

After the draft master task and KSAO list was completed, an informal focus group was conducted with several senior flight school instructors at Ft. Rucker, AL. The intent of this session was to gather general feedback regarding whether the statements, as written, would be interpretable and meaningful to the participants in the JAQ sample. Based on the instructors' feedback, the task and KSAO list was revised and the statements themselves were edited to be more consistent with Army aviation terminology. Some statements were added to reflect changes anticipated with the Army's transition to Flight School XXI. The task and KSAO list was then reformatted into a draft JAQ.

Four SME focus group sessions were then conducted to review the draft JAQ. These half-day sessions were conducted with 21 senior flight instructors in groups of four to seven participants, representing all four helicopter platforms covered by the JAQ. Table 1 shows the demographic breakdown of the workshop participants. The sample consisted primarily of Caucasian, male, Warrant Officers who had served as Army pilots for an average of 15.2 years and had been in the Army for an average of 18.6 years. During these workshops, project staff provided an overview of the SIFT project and explained the purpose of the sessions. Then each group reviewed the entire JAQ, item by item, to ensure that the meaning of each statement was clear, that terminology was recognizable and correct, and that the content was exhaustive. In addition, feedback was gathered regarding the structure of the JAQ, especially with regard to the grouping of task statements. The results of these workshops guided substantial revisions and improvements to the JAQ. Participants in these workshops also provided feedback regarding the necessary level of experience flight instructors should possess to knowledgably contribute to the JAQ data collection.

The final step in developing the JAQ was to review the document with researchers familiar with both Army aviation and job analysis, and to ensure that the JAQ met Army sensitivity guidelines. These last revisions resulted in the final version that was administered to flight instructors, as described below. The final JAQ contained 101 task statements (grouped according to 11 duty categories) and 92 KSAO statements to be rated on a 5-point importance scale from "not part of job" (0) or "unimportant" (1) to "critical" (5). The JAQ is presented in Appendix B.

Table 1

Demographics for JAQ Review Workshop Participants

Variable	Frequency	Percent*
Gender		
Male	21	100
Ethnic Origin		
Caucasian	19	90
Hispanic/Latino/Mexican American	2	10
Rank		
WO-3	7	33
WO-4	7	33
O-3	1	5
O-4	2	10
Airframe		
AH-64 (Apache)	2	10
CH-47 (Chinook)	3	14
OH-58 (Kiowa Warrior)	8	38
UH-60 (Blackhawk)	4	19

**Note*. Percentages may not add to 100% due to missing data.

JAQ Administration

The JAQ was administered in paper-and-pencil form at Ft. Rucker, Alabama. The questionnaires were distributed in conjunction with safety meetings, all day gatherings during which flight instructors received updated safety training and viewed presentations by a variety of speakers. The project team members visited each of four battalions, representing the four airframes of interest, over the course of one day. At each session, one of the project staff members gave a 10-minute briefing that provided an overview of the SIFT project, explained the purpose of the JAQ, and emphasized the importance of the participants' input. After the briefing, informed consent forms were distributed (see Appendix C) to be reviewed and signed, and staff

collected the signed forms. During the informed consent process, project staff answered questions from participants and offered further explanation of the project, as needed.

After all informed consent forms were returned, the JAQs were distributed and project staff instructed the participants to complete them within the next two days and to turn them in to the Battalion Point of Contact (POC). Approximately 275 JAQs were distributed during the sessions, and 50 more were left behind in case Battalion POCs needed more copies. The Battalion POCs returned 234 completed questionnaires, which corresponds to a return rate of approximately 72%. The return rate is approximate because it was not possible to track the exact number of additional questionnaires that were distributed by the POCs following the group sessions.

Analysis of the JAQ

The 234 JAQs received were screened for exclusionary response patterns. The remaining questionnaires were analyzed to generate descriptive statistics for task and KSAO importance ratings within airframes, as well as across the entire sample. The following section describes the analysis of the JAQ.

Data Screening

The data were screened using several criteria: response patterns suggesting that participants were not paying attention to item content; responses that only used the extreme ends of the rating scale, and; substantial amounts of missing data (10% or more). As a result of these checks, 22 cases (9%) were dropped from the sample, resulting in a final sample size of 212.

Table 2 shows the demographic breakdown of the sample after screening. The sample consisted primarily of male (95%), Caucasian (87 %) flight instructors. Consistent with the population of flight instructors, the majority of the sample consisted of Warrant Officers (91%). Each platform was adequately represented in the sample, with UH-60 pilots being the largest group, as they are in the population of flight instructors. The average number of flight hours was 2044 hours (*SD* = 1346 hours), and the average tenure as an aviator was 13.7 years (*SD* = 5.0 years).

Analyses

Statistics for both the task and the KSAO ratings were computed within airframe, as well as across the entire sample. The separate analyses were conducted because Army rotary wing aircraft are specifically designed and built to perform different missions. For instance, attack aircraft, including the AH-64A, *Apache,* and AH-64D, *Apache Longbow,* are primarily designed for offensive combat missions. They typically provide air artillery support for ground troops using air-to-ground missiles. Scout/observation aircraft, such as the OH-58D, *Kiowa,* provide reconnaissance, or information-gathering, functions in the combat environment. These aircraft are small and are designed to be not easily detected by the enemy. Utility aircraft, such as the UH-60A, *Blackhawk*, provide transportation of light-weight supplies and small groups of personnel in a combat support role. Cargo aircraft, such as the CH-47D, *Chinook*, are larger aircraft capable of moving heavy supplies or transporting larger groups of personnel.

Composite scores were also computed for each duty category of the JAQ (e.g., all items pertaining to "Planning" were averaged into a composite score). Multivariate analysis of variance (MANOVA), with post hoc *F*-tests, was then used to test for significant differences, by airframe, of the relative importance of the tasks (both at the individual task level and duty category level) and the KSAOs.

Table 2

Demographics for JAQ Survey Sample

Variable	**Frequency**	**Percent**
Gender		
Male	201	94.8
Female	11	5.2
Ethnic Origin		
African American/Black	6	2.8
Asian American/Pacific Islander	1	0.5
Caucasian	185	87.3
Hispanic/Latino/Mexican American	8	3.8
Native American/Alaskan Native	1	0.5
Other/Missing	11	5.2
Rank		
WO-2	90	42.5
WO-3	75	35.4
WO-4	27	12.7
O-3	12	5.7
O-4	2	0.9
O-5	2	0.9
Other	4	1.9
Airframe		
AH-64 (Apache)	46	21.7
CH-47 (Chinook)	44	20.8
OH-58 (Kiowa Warrior)	55	25.9
UH-60 (Blackhawk)	67	31.6

Results

Tasks related to emergency procedures and safety received the highest importance ratings across all airframes. The patterns of task importance ratings within airframes appeared rational and interpretable. For example, tasks related to *Attack* received the highest importance ratings from the AH-64 sample (an attack helicopter), followed next by the OH-58 sample (a scout helicopter with attack capabilities). The CH-47 and UH-60 samples (both transport helicopters) did not provide very high importance ratings for these tasks. Similarly, tasks related to *Lift* were rated as more important by the CH-47 and UH-60 samples than either the AH-64 or OH-58 samples.

With respect to the KSAOs, *Situational Awareness*, *Operation and Maneuvering of Helicopter*, *Psychomotor Ability*, *Information Processing*, and *Decision Making* received the highest importance ratings across all airframes.

Comprehensive results for these analyses are shown in the appendices as follows:

- Appendix D contains the task rating descriptive statistics for the entire sample, as well as separately by airframe.
- Appendix E contains the KSAO rating descriptive statistics for the entire sample, as well as separately by airframe.

Based on the importance ratings provided in the JAQ, further analyses were conducted to test for differences between airframes. The section below describes the results of these analyses at the duty category, task, and KSAO level.

Duty Category Comparisons across Airframes

Composite scores were computed by averaging across all of the items within each task duty area. In general, it was expected that certain duty areas might be more important for the operation of one type of aircraft versus another. The task of employing a weapon, for example, was predicted to be most important for the AH-64. In contrast, performing internal or external load operations was predicted to be most important for the CH-47 or UH-60.

As mentioned earlier, each of the 101 tasks included on the JAQ were grouped under one of 11 broader duty categories (See Table 3 for list of categories). Composite scores were computed for each duty category by averaging the importance ratings given for each of the task statements included in that category. Duty category composites were only computed for those respondents that had provided valid ratings for at least half of the items comprising that composite.

To investigate the overall differences between aircraft, a multivariate F-test was performed. Results of this test were significant (Wilks' Lambda = 15.38, $p < .05$), revealing that differences were observed among the four types of airframes across duty category. Specifically, results of the post hoc, univariate F-tests revealed that these differences were significant (using a

Bonferroni corrected alpha of .005) with regard to four specific duty categories: *In-flight Take-off* ($F = 4.71, p < .005$), *Reconnaissance* ($F = 36.02, p < .005$), *Lift* ($F = 114.32, p < .005$), and *Attack* ($F = 84.20, p < .005$).

In general, these findings confirmed previous expectations. That is, because *Reconnaissance*, *Lift*, and *Attack* missions are typically associated with a specific type of aircraft, it was expected that the aircraft importance means would vary with regard to these three duty categories. Additional post-hoc tests revealed that that the *Reconnaissance* and *Attack* means were greatest for the AH-64 and OH-58. In addition, *Lift* operations were rated as most important for the CH-47 and UH-60. Finally, *In-flight Take-off* was rated significantly higher for AH-64D than both CH-47D and OH-58. The results of these analyses, including the means and standard deviations for each airframe, are displayed in Table 3.

Task Level Comparisons across Airframes

Differences between airframes were also investigated at the task level. Again, a multivariate *F*-test was performed using the importance means for each aircraft for each of the 101 tasks. The results of this test were significant (Wilks' Lambda = 5.48, $p <. 05$), revealing differences among the task means for the four types of aircraft. In addition, results of the post hoc, univariate *F*-tests revealed significant results for 34 of the 101 tasks. These 34 tasks are listed in Table 4 by airframe. Again, a restricted significance level (coefficient alpha = .001) was used to make these comparisons using the Bonferroni procedure.

As predicted, these results displayed a similar trend as was observed with the duty categories. For the tasks associated with both *Reconnaissance* and *Attack* operations, the AH-64 and OH-58 were consistently rated as the most important. There were also a limited number of tasks included under *Attack* operations (e.g., *perform ABF operations to engage target*, *engage target with gun system*, *perform SCAS-OFF/BUCS-ON Flight*) where the AH-64 was rated significantly higher than the OH-58. With regard to the tasks included under *Lift* operations, the CH-47 and UH-60 were again observed to have the largest means. However, the UH-60 was rated significantly higher than all three other airframes with regards to one specific task (*perform volcano operations*).

KSAO Level Comparisons across Airframes

Similar to the tasks, it was also expected that a limited number of the KSAO's (e.g., *knowledge of engagement procedures*, *skill in the operation of weapon systems and equipment*) might be more important for one type of aircraft versus another (e.g., AH-64 versus UH-60). However, results of a multivariate *F*-test suggested that there were no significant overall differences between airframes for any of the KSAOs (Wilks' Lambda = 1.40, $p > .05$). This result was somewhat surprising due to the fairly specialized nature of some of the KSAOs. However, two explanations seem plausible. First, although a few of the KSAOs listed on the JAQ were somewhat limited in scope, it could be argued that the majority were not necessarily aircraft specific. For example, many of the knowledge areas and abilities targeted either general aspects of flying (e.g., *knowledge of aviation principles*) or broad cognitive abilities.

Table 3

Descriptive and Inferential Statistics of Duty Category Composites by Airframe

Composite	AH-64		CH-47		OH-58		UH-60		*F*	Sig.
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*		
Planning	4.08	.63	3.83	.66	3.74	.56	4.03	.61	3.54	.02
Pre-flight	3.85	.79	3.61	.75	3.96	.61	3.90	.72	1.47	.22
In-flight – Take-off*	4.22	.69	3.75	.78	3.86	.69	4.08	.67	4.71	.00
In-flight – En-route	4.21	.61	3.83	.72	3.90	.59	4.04	.59	4.00	.01
Landing	3.87	.76	3.47	.72	3.55	.68	3.75	.72	3.48	.02
Post-flight	3.61	.93	3.04	1.09	3.42	.90	3.32	.91	2.99	.03
Crew Coordination–External	3.80	.93	3.31	.91	3.97	.93	3.63	.90	3.43	.02
Crew Coordination - Internal	4.08	.78	3.87	.74	4.10	.72	4.07	.64	3.52	.02
Recon*	3.70	.82	1.87	1.06	3.96	1.04	2.35	1.31	36.02	.00
Lift*	.31	.94	2.61	.75	.43	1.08	2.99	.90	114.32	.00
Attack*	4.08	.61	0.55	1.22	3.22	1.25	0.97	1.55	84.20	.00

**Note.* Asterisk indicates statistical significance using a Bonferroni corrected alpha of .005.

Table 4

Task Importance Descriptive Statistics for those Tasks Demonstrating Statistically Significant Differences by Airframe

Task	AH-64D		CH-47		OH-58		UH-60	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Plan IFR flight	3.56	1.25	3.41	1.15	2.00	1.43	4.07	.84
Perform aircraft survivability equipment (ASE) operational checks	4.04	.94	3.91	.91	3.27	1.35	3.81	.86
Perform before taxi checks	3.96	.87	3.36	.99	3.11	1.49	3.72	.92

Task	AH-64D		CH-47		OH-58		UH-60	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Perform before-take-off and hover checks to evaluate aircraft performance and systems	4.54	.69	3.67	.87	4.25	.70	4.33	.75
Perform holding procedures	3.20	1.24	2.73	1.26	1.62	1.24	3.15	1.17
Interpret system symbology displayed by night systems	4.69	.51	2.77	1.43	3.25	1.64	3.13	1.36
Perform flight navigation by dead reckoning	3.91	.98	3.86	1.03	3.29	1.07	4.06	.87
Perform appropriate IFR approach	3.67	1.10	3.77	1.09	2.58	1.75	4.09	.81
Identify major US or allied equipment and major threat equipment in the area of operations	4.48	.62	3.05	1.46	4.07	1.04	3.53	1.11
Conduct reconnaissance (zone, area, route) to identify natural/manmade features within specific boundaries and routes for elements, such as trails, bridges, etc.	3.52	.94	1.81	1.55	3.93	1.13	2.30	1.65
Perform aerial observation to detect, identify, locate, and report using stationary and motive techniques	3.65	.95	1.86	1.30	4.17	1.08	2.11	1.68
Call for and adjust fire	3.46	1.09	1.23	1.13	3.70	1.30	1.92	1.52

Task	AH-64D		CH-47		OH-58		UH-60	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Conduct route reconnaissance to identify detailed information about a specific route (including adjacent terrain usability), especially where the enemy could influence movement	3.37	1.14	1.40	1.40	3.94	1.14	1.97	1.62
Perform internal load operations	.29	.92	4.00	.86	.60	1.31	3.69	.97
Perform external load operations	.31	1.13	4.50	.90	.51	1.38	4.09	.81
Perform Rappelling/FRIES procedures	.29	.92	1.93	1.39	.40	1.08	2.79	1.32
Perform STABO/SPIES operations	.29	1.02	1.77	1.29	.40	1.08	2.73	1.32
Perform rescue-hoist operations	.29	.92	2.68	1.27	.40	1.12	3.27	1.16
Perform paradrop operations	.29	.92	2.86	1.25	.34	.92	2.42	1.30
Perform volcano operations	.29	.92	.52	1.00	.34	.92	1.96	1.38
Perform aerial observation	3.67	.97	1.45	1.81	3.72	1.47	1.38	1.67
Perform ABF operations to engage target	4.39	.74	.45	1.34	3.22	1.37	.86	1.54
Employ appropriate weapon system to engage target	4.61	.65	.93	1.82	3.76	1.53	.98	1.76
Perform appropriate firing techniques	4.57	.58	.70	1.68	3.86	1.55	.97	1.76
Engage target with rocket system	4.67	.63	.35	1.25	3.78	1.56	.84	1.65
Engage target with missile system	4.76	.52	.35	1.25	3.78	1.56	.84	1.65
Engage target with gun system	3.74	1.95	.35	1.25	1.47	2.08	.84	1.65

Task	AH-64D		CH-47		OH-58		UH-60	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Engage target with ATAS	2.09	2.21	.35	1.25	1.84	1.68	.83	1.61
Designate target with appropriate aircraft system	4.57	.62	.35	1.25	3.68	1.54	.83	1.61
Track target with appropriate aircraft system	4.61	.61	.33	1.19	3.72	1.58	.81	1.58
Call for a tactical air strike	3.65	.85	.63	1.39	3.12	1.41	1.33	1.65
Perform artillery call for fire	3.67	.97	.80	1.45	3.46	1.50	1.38	1.67
Perform target handover	4.28	.69	.35	1.12	3.52	1.36	1.03	1.70
Perform SCAS-OFF/BUCS-ON Flight	3.83	1.00	.38	1.17	2.10	1.33	.85	1.63

While the KSAO list was comprehensive, recall that the primary goal for this project was to identify, develop, and validate a battery of tests for selection of Army rotary wing aviators, that is, across airframes. Thus, to the extent there might be very specific knowledge areas or skills that are differentially important to one aircraft or another, they have not been included in this list. A second reason for the lack of significant differences across platforms may be that certain knowledge areas and skills build on one another. Although on the surface, one KSAO might seem more important for a specific type of aircraft, it may also be closely linked with other KSAOs that are important for other types of aircraft.

Conclusions

The job inventory approach is a systematic process designed to generate a comprehensive job analysis. The JAQ that was developed from this process allowed the activities performed by US Army aviators to be analyzed and the personal attributes required to perform those activities to be examined. Thus it could be said that the approach was used effectively in this research to reveal those aptitudes required for current aviator performance.

Analysis of the JAQ tasks revealed that those statements related to emergency procedures and safety were judged as most important across all airframes. However, the patterns of specific task importance ratings within airframes appeared to be directly related to the mission performed by that specific aircraft. Thus, *Attack*-related tasks received the highest importance ratings from the attack helicopter samples and tasks related to *Lift* were rated as more important by the cargo helicopter samples. This finding might serve a useful function in the next phase of SIFT development, that is, the creation of an instrument designed to assist the Army in the rational classification of aviators into the airframes for which they are best suited.

With respect to KSAOs, *Situational Awareness*, *Operation and Maneuvering of Helicopter*, *Psychomotor Ability*, *Information Processing*, and *Decision Making* received the highest importance ratings across all airframes. This finding, in conjunction with the results of a

focused pilot selection literature review, was used to help identify predictor measures for validating the SIFT prototype test battery. Specifically, it was recommended that the Army institute a two-stage aviator selection process. The first stage of testing would measure cognitive and personality or motivational traits important for the aviator job. The US Navy currently uses a pilot selection test battery that measures cognitive abilities important for US Army aviators, and this battery can be adopted for Army aviator selection. The US Army also possesses two non-cognitive (personality/motivation) inventories that can be adapted for use with the Army aviator applicant population. In addition, a small number of new ability tests and non-cognitive scales were developed under the SIFT project to measure abilities or traits that are not currently measured by any of the readily-accessible test batteries or non-cognitive instruments.

Based on the results of the job analysis described herein, as well as the literature review completed as Task 1 of the SIFT project, the following predictor measures were recommended for inclusion in a prototype battery for validity testing:

- *Cognitive ability*: Including all cognitive subtests from the Navy's Aviator Selection Test Battery (ASTB). The Navy has agreed to allow the Army access to their Internet-based delivery platform, Automated Pilot Examination (APEX).

- *Perceptual Speed & Accuracy*: Using a newly-developed test, specifically designed for Army aviation selection.

- *Personality/Temperament*: Using the Army Assessment of Individual Motivation (AIM) and the Test of Adaptive Personality (TAP).

- *Motivation/Attitude*: Using a newly-developed Army Aviation Information Test and the Army Aviation Identification Scale.

- *Task Prioritization*: Using the "Popcorn Test." It presents boxes of differing sizes moving across the computer screen at differing rates. The test-taker is challenged to maximize points by erasing (with cursor placement) larger, faster-moving boxes first. Note that this includes some aspects of psychomotor ability, but tests specifically designed to measure psychomotor ability are being explored by the Navy and might serve the Army in classification efforts to follow, given resource limitations.

As suggested by the job analysis, the second stage of the test battery would include performance-based measures of psychomotor and information processing skills. However, as these tests require non-standard computer peripherals (and consequently extensive resources), they may better serve the needs of Army aviation as classification instruments for tracking selected aviators into one of the four mission platforms. The Navy is currently exploring the application of these types of tests to Navy pilot selection, and the Army may be able to build on those efforts in the development of an aviator classification instrument.

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Appendix A

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Appendix B

U. S. Army Rotary Wing Pilot Job Analysis Questionnaire

Army Rotary Wing Pilot Job Analysis
Background Information

The purpose of this questionnaire is to obtain information about tasks performed by Army aviators, and the knowledges, skills, abilities, and other characteristics required to perform those tasks. This information is being used to develop a new assessment tool for selecting students for aviation training.

Please complete all of the items below. This information will not be used to identify any individual, and will be treated as confidential. The primary purpose of this background information is to document, at a group level, the participation of actual job experts in the workshop.

Today's date: _____

Your name: _____

Age: _____

Your gender: _____ female _____ male

Your race/ethnicity: _____ African American / Black
_____ Asian American / Pacific Islander
_____ Caucasian / White
_____ Hispanic / Latino / Mexican American
_____ Native American / Alaskan Native
_____ Other (please specify): _____

Your rank (e.g., E-5, WO-4, O-3): _____

What is your current duty position? _____

_____

What is your primary aircraft in your current duty position? _____

_____

How long have you been in your current duty position? _____

How many flight hours in Army aircraft do you have? _____ hours

How long have you been an Army aviator? _____ years _____ months

How long have you been in the Army (in any MOS)? _____ years _____ months

How many years of military service do you have? Active Component Service _____
Reserve Component Service _____

The purpose of this questionnaire is to develop a description of the Rotary Wing Pilot job, as it is currently performed in the U. S. Army, in a variety of aircraft and missions. We are asking many different Pilots to complete the questionnaire so we can obtain a complete and well-documented summary of the job. The results will be compiled by a consulting firm, Personnel Decisions Research Institutes (PDRI), and presented in summary form to the Army Research Institute for the Behavioral and Social Sciences (ARI). *Individual responses will not be reported and no one from the Army will see any individual level data. All information provided will be completely confidential.*

This questionnaire consists of two parts: a list of **job tasks** and a list of **knowledges, skills, abilities, and other characteristics** that may be important for successful pilot performance.

Part I - Tasks

In this first section, we are asking you to rate the *importance* of each of the following task statements to completion of an Army Rotary Wing Pilot's mission. One way to consider importance is in terms of the consequences that would occur if the task were not performed correctly — the more severe the consequences, the more important the task. Another way to consider this is to think of how central the task is to the overall mission of the unit.

An example of how this process works is shown below. Note that this example uses the job of School Bus Driver for illustrative purposes:

Please blacken the circle corresponding to the rating (0-5) that best describes how important each task is to School Bus Driver job performance.

Tasks	**Importance** How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
1. Help children with their homework	● ① ② ③ ④ ⑤
2. Obey traffic laws and regulations	⓪ ① ② ③ ④ ●

Statement 1: The task "Help children with their homework" is not performed by a School Bus Driver, so ⓪ was blackened in the Importance column.

Statement 2: The task "Obey traffic laws and regulations" is crucial for successful performance of the School Bus Driver job, so a ⑤ was blackened for the Importance rating.

Please note that you are to rate the tasks that a Rotary Wing Pilot performs on the job, not an Instructor Pilot or supervisor. If you are a Pilot, think specifically about your own job duties. If you are an Instructor Pilot or supervisor, please consider Pilot duties only. Furthermore, please be sure to respond to the items with regard to the aircraft that you are presently flying. That is, even if you have experience in different aircraft, consider only the aircraft you are assigned to now as you work through the questionnaire.

Also, for tasks that are of importance to effective Army Rotary Wing Pilot performance, please be sure to use the entire scale to rate that performance. Some tasks are clearly more important than others, and your ratings should reflect those differences. Further, be sure to rate only the most important tasks at the highest, or ⑤, level.

If you wish to add any tasks to the list, there is room for you do to so at the end. Please make sure that you provide ratings for any tasks that you add.

Remember:

- Base your ratings on importance of the task to the aircraft you are currently flying.
- Make your ratings only on the job of Army Rotary Wing Pilot, not Instructor Pilot or supervisors
- Be sure to use the entire scale to make your ratings, and reserve the highest level for only the most important tasks.

Thank you for your assistance with this project.

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
Planning	
1. Gather information and materials to prepare for mission planning	⓪ ① ② ③ ④ ⑤
2. Check status of aircraft	⓪ ① ② ③ ④ ⑤
3. Plan VFR flight	⓪ ① ② ③ ④ ⑤
4. Plan IFR flight	⓪ ① ② ③ ④ ⑤
5. Perform tactical flight mission planning using the factors of METT-TC (mission, enemy, terrain/weather, troops, time, and civilians) to determine relevant mission information (e.g., appropriate terrain flight modes, primary and alternate routes, amount of fuel required, ROE, weapons engagement, and overall mission risk)	⓪ ① ② ③ ④ ⑤
6. Operate electronic mission planning station to select and enter appropriate flight and mission information	⓪ ① ② ③ ④ ⑤
7. Verify aircraft performance planning using appropriate performance data charts to ensure aircraft performance limitations are in accordance with current environmental conditions	⓪ ① ② ③ ④ ⑤
8. Conduct air mission briefing and rehearsal to explain crew member responsibilities and duties	⓪ ① ② ③ ④ ⑤
9. Plan for contingency operations	⓪ ① ② ③ ④ ⑤
10. Obtain and analyze weather briefing	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
Pre-flight	
11. Conduct passenger briefing to ensure understanding of mission information and emergency procedures	⓪ ① ② ③ ④ ⑤
12. Verify aircraft weight and balance using appropriate charts to ensure that CG and gross weight remain within aircraft limits	⓪ ① ② ③ ④ ⑤
13. Perform a pre-flight inspection to identify aircraft and mission equipment discrepancies	⓪ ① ② ③ ④ ⑤
14. Obtain and inspect appropriate aviation life support equipment (ALSE)	⓪ ① ② ③ ④ ⑤
15. Obtain fuel samples to check for fuel contamination	⓪ ① ② ③ ④ ⑤
16. Configure cockpit and mission equipment	⓪ ① ② ③ ④ ⑤
17. Perform engine start through before-take-off checks	⓪ ① ② ③ ④ ⑤
18. Ensure clearance of ground personnel, ground equipment, and other aircraft	⓪ ① ② ③ ④ ⑤
In-flight – Take-off	
19. Perform aircraft survivability equipment (ASE) operational checks	⓪ ① ② ③ ④ ⑤
20. Properly coordinate with air traffic control (ATC)	⓪ ① ② ③ ④ ⑤
21. Perform before taxi checks	⓪ ① ② ③ ④ ⑤
22. Perform ground or hover taxi to position aircraft as needed	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
23. Perform before-take-off and hover checks to evaluate aircraft performance and systems	⓪ ① ② ③ ④ ⑤
24. Perform appropriate take-off (e.g., VMC, IMC, rolling, terrain, pinnacle, max performance)	⓪ ① ② ③ ④ ⑤
25. Perform hovering flight	⓪ ① ② ③ ④ ⑤
In-flight – En-route	
26. Monitor flight instruments equipment and systems	⓪ ① ② ③ ④ ⑤
27. Perform cross checks to evaluate performance of systems	⓪ ① ② ③ ④ ⑤
28. Navigate using electronic systems and navigational radios to maintain flight position along planned route	⓪ ① ② ③ ④ ⑤
29. Perform holding procedures	⓪ ① ② ③ ④ ⑤
30. Perform unusual attitude recovery	⓪ ① ② ③ ④ ⑤
31. When inadvertent IMC conditions are encountered, perform inadvertent IMC recovery procedures	⓪ ① ② ③ ④ ⑤
32. Operate IFF system	⓪ ① ② ③ ④ ⑤
33. Interpret system symbology displayed by night systems	⓪ ① ② ③ ④ ⑤
34. During approach, perform go-round maneuver when a safe landing cannot be accomplished.	⓪ ① ② ③ ④ ⑤
35. Perform flight navigation by pilotage	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
36. Perform flight navigation by dead reckoning	⓪ ① ② ③ ④ ⑤
37. Perform terrain flight maneuvers	⓪ ① ② ③ ④ ⑤
38. Perform flight deceleration to reduce airspeed or attain a full stop	⓪ ① ② ③ ④ ⑤
39. Perform standard or steep turns (ascending, descending, level) to place aircraft in the desired heading and altitude	⓪ ① ② ③ ④ ⑤
40. Perform straight-and-level flight while maintaining heading and altitude	⓪ ① ② ③ ④ ⑤
41. Perform climbs to maneuver aircraft to appropriate altitude	⓪ ① ② ③ ④ ⑤
42. Perform descents to maneuver aircraft to appropriate altitude	⓪ ① ② ③ ④ ⑤
43. Perform unusual attitude recovery	⓪ ① ② ③ ④ ⑤
44. Perform evasive maneuvers consistent with the type of threat encountered	⓪ ① ② ③ ④ ⑤
45. Perform actions on contact	⓪ ① ② ③ ④ ⑤
46. Perform masking to protect the aircraft from enemy visual and electronic detection and unmask as needed	⓪ ① ② ③ ④ ⑤
47. Perform ECM/ECCM procedures	⓪ ① ② ③ ④ ⑤
48. Conduct airspace surveillance to detect air traffic or obstacles	⓪ ① ② ③ ④ ⑤
49. Negotiate wire obstacles to ensure obstacle avoidance and aircraft clearance	⓪ ① ② ③ ④ ⑤
50. Operate aircraft using night vision goggles	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
51. Perform fuel management procedures	⓪ ① ② ③ ④ ⑤
52. Perform aircraft emergency procedures	⓪ ① ② ③ ④ ⑤
53. Perform cruise checks to evaluate performance of systems	⓪ ① ② ③ ④ ⑤
Landing	
54. Perform before-landing check	⓪ ① ② ③ ④ ⑤
55. Conduct landing area reconnaissance	⓪ ① ② ③ ④ ⑤
56. Perform appropriate VMC approach and landing	⓪ ① ② ③ ④ ⑤
57. Perform appropriate IFR approach	⓪ ① ② ③ ④ ⑤
58. Apply appropriate environmental considerations based on type of landing area (e.g., rough terrain, smooth terrain, deck, sand, dust, snow)	⓪ ① ② ③ ④ ⑤
59. Perform slope operations	⓪ ① ② ③ ④ ⑤
60. Interpret hand and arm signals to safely maneuver aircraft	⓪ ① ② ③ ④ ⑤
Post-Flight	
61. Perform or monitor FARP operations	⓪ ① ② ③ ④ ⑤
62. Perform after-landing through engine shutdown checks	⓪ ① ② ③ ④ ⑤
63. Perform aircraft security check after the last flight of the day	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
Air Crew Coordination - Internal	
64. Ensure crewmembers have information to complete mission objectives	⓪ ① ② ③ ④ ⑤
65. Coordinate and direct crewmember tasks in order to accomplish collective tasks	⓪ ① ② ③ ④ ⑤
66. Designate duties and responsibilities to crew members to accomplish mission tasks	⓪ ① ② ③ ④ ⑤
67. Direct and/or offer assistance to crewmembers as needed	⓪ ① ② ③ ④ ⑤
68. Cross-monitor crewmembers actions and decisions to reduce likelihood of errors	⓪ ① ② ③ ④ ⑤
69. Facilitate information flow among crewmembers to keep crewmembers informed of relevant events and information	⓪ ① ② ③ ④ ⑤
70. Resolve flight-related problems as they arise to ensure mission safety and completion	⓪ ① ② ③ ④ ⑤
71. Maintain aircrew situational awareness and common frame of reference by announcing mission-critical information to crewmembers	⓪ ① ② ③ ④ ⑤
72. Participate in after-action review to constructively review mission with crewmembers	⓪ ① ② ③ ④ ⑤
73. Apply "lessons learned" from after-action review in subsequent missions	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
Air Crew Coordination – External	
74. Operate and monitor radios (data and voice) to communicate with Tactical Operations Center (TOC) and other units or stations	⓪ ① ② ③ ④ ⑤
75. Transmit tactical reports	⓪ ① ② ③ ④ ⑤
Reconnaissance	
76. Identify major US or allied equipment and major threat equipment in the area of operations	⓪ ① ② ③ ④ ⑤
77. Conduct reconnaissance (zone, area, route) to identify natural/manmade features within specific boundaries and routes for elements, such as trails, bridges, etc.	⓪ ① ② ③ ④ ⑤
78. Perform aerial observation to detect, identify, locate, and report using stationary and motive techniques	⓪ ① ② ③ ④ ⑤
79. Call for and adjust fire	⓪ ① ② ③ ④ ⑤
80. Conduct route reconnaissance to identify detailed information about a specific route (including adjacent terrain usability), especially where the enemy could influence movement	⓪ ① ② ③ ④ ⑤
Lift	
81. Perform internal load operations	⓪ ① ② ③ ④ ⑤
82. Perform external load operations	⓪ ① ② ③ ④ ⑤
83. Perform Rappelling/FRIES procedures	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
84. Perform STABO/SPIES operations	⓪ ① ② ③ ④ ⑤
85. Perform rescue-hoist operations	⓪ ① ② ③ ④ ⑤
86. Perform paradrop operations	⓪ ① ② ③ ④ ⑤
87. Perform volcano operations	⓪ ① ② ③ ④ ⑤
Attack	
88. Perform aerial observation	⓪ ① ② ③ ④ ⑤
89. Perform ABF operations to engage target	⓪ ① ② ③ ④ ⑤
90. Employ appropriate weapon system to engage target	⓪ ① ② ③ ④ ⑤
91. Perform appropriate firing techniques	⓪ ① ② ③ ④ ⑤
92. Engage target with rocket system	⓪ ① ② ③ ④ ⑤
93. Engage target with missile system	⓪ ① ② ③ ④ ⑤
94. Engage target with gun system	⓪ ① ② ③ ④ ⑤
95. Engage target with ATAS	⓪ ① ② ③ ④ ⑤
96. Designate target with appropriate aircraft system	⓪ ① ② ③ ④ ⑤
97. Track target with appropriate aircraft system	⓪ ① ② ③ ④ ⑤
98. Call for a tactical air strike	⓪ ① ② ③ ④ ⑤
99. Perform artillery call for fire	⓪ ① ② ③ ④ ⑤

	Importance How important is this task for effective mission completion? 0 = Not part of job 1 = Unimportant 2 = Some importance 3 = Important 4 = Very important 5 = Critical
100. Perform target handover	⓪ ① ② ③ ④ ⑤
101. Perform SCAS-OFF/BUCS-ON Flight	⓪ ① ② ③ ④ ⑤
Please use this area to write in additional tasks that you believe were not represented above:	
	⓪ ① ② ③ ④ ⑤
	⓪ ① ② ③ ④ ⑤
	⓪ ① ② ③ ④ ⑤
	⓪ ① ② ③ ④ ⑤
	⓪ ① ② ③ ④ ⑤
	⓪ ① ② ③ ④ ⑤
	⓪ ① ② ③ ④ ⑤
	⓪ ① ② ③ ④ ⑤

Part II: Knowledges, Skills, Abilities and Other Characteristics

In this section of the questionnaire, we would like you to rate the importance of a set of Knowledges, Skills, Abilities, and Other Characteristics (KSAOs) that may influence Army Rotary Wing Pilot Performance.

For the purposes of this questionnaire, 'Knowledges' refer to facts or information about a particular topic. Similarly, 'Skills' refer to a competence to perform a learned action and 'Abilities' are stable, enduring attributes people may possess that enable them to perform certain tasks. The statements describing Knowledges, Skills, and Abilities, along with some additional 'Other Characteristics' constitute Part II of this questionnaire. People may vary with regard to their standing on a particular KSAO, but for this project, we are asking you to rate whether a particular KSAO, as described, is important to Army Rotary Wing Pilot performance. The process for making these ratings is described below.

First, carefully read each statement and decide whether or not it describes a KSAO that is needed to be an effective Rotary Wing Pilot. If the KSAO is not needed to be an effective Pilot, blacken the ⓪. Second, if the statement describes something that is necessary to be an effective Pilot, rate the importance of that statement for effective job performance. Use the scale provided by blackening the number that corresponds to the importance of the statement.

An example of how this process works is shown below. As in the example used in Part I of this questionnaire, this example uses the job of School Bus Driver for illustrative purposes:

	Importance How important is knowledge of this topic for effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
Knowledge	
1. **Students Academic Progress** – students' grades and how they are progressing with their school work	● ① ② ③ ④
2. **Traffic Laws and Regulations** – legal requirements and regulations that govern driving on public roadways	⓪ ① ② ③ ●

Statement 1: The statement describing knowledge of "Students Academic Progress" is not needed for successful performance of the School Bus Driver job, so ⓪ would be blackened in the Importance column.

Statement 2: The statement describing knowledge of "Traffic Laws and Regulations" is crucial for successful performance of the School Bus Driver job, so a ④ was blackened for the Importance rating.

If you believe that any important factors that influence Army Rotary Wing Pilot effectiveness were not included in the list, there is space for you to add more at the end. Please be sure to provide ratings for any KSAOs that you add.

Remember:

- Base your ratings of importance of the KSAO on the aircraft you are currently flying.
- Do NOT make the ratings based on your own level of the KSAOs. Instead, make your ratings based on the importance of the KSAO to effective Army Rotary Wing Pilot performance
- Make sure that you read the label for the KSAO AND the definition so that you fully understand what each statement means before making your rating.

	Importance How important is **knowledge** of this topic to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
Knowledge	
1. **Unit/Command Objectives**—e.g., unit's function and operations; METL, air mission briefs and commander's intent	⓪ ① ② ③ ④
2. **Aviation Principals**—e.g., fundamentals of flight; force; gravity; speed; velocity; distance; motion; altitude, direction; object rotation; geography/terrain	⓪ ① ② ③ ④
3. **Basic Operation Procedures**—e.g., loading/unloading procedures for internal and external load operation; cockpit equipment operation; emergency procedures; safety procedures; post-flight checks	⓪ ① ② ③ ④
4. **Aircraft Systems Operations**—e.g., navigation; sensors; weapons	⓪ ① ② ③ ④
5. **Communication Procedures**—e.g., radio, data, intercom operation; system display indicator operation; tactical report transmission; crew coordination	⓪ ① ② ③ ④
6. **Threat Categories and Indicators**—e.g., types of enemy systems; warning and detection systems; identification	⓪ ① ② ③ ④
7. **Reconnaissance Procedures**—e.g., scanning assigned sectors; aerial observation; route, zone, and area reconnaissance	⓪ ① ② ③ ④
8. **Engagement Procedures**—e.g., weapons control measures; firing position operations; weapons initialization; weapon system operation; masking and unmasking; target handover procedures	⓪ ① ② ③ ④

	Importance How important is **knowledge** of this topic to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
9. **Meteorology**—e.g., ambient light; clouds and precipitation; forces and winds; air masses and fronts; weather forecasting; storms; effects of weather on aircraft operations	⓪ ① ② ③ ④
10. **Aeronautical Terminology**—e.g., principles and practices of navigation; aviation phraseology; standard crew terminology	⓪ ① ② ③ ④
11. **Operational Terms and Graphics**—e.g., chart and map reading, topography, symbology	⓪ ① ② ③ ④
12. **Flight Rules and Regulations**—e.g., civil, military, and unit specific regulations (SOP)	⓪ ① ② ③ ④

	Importance How important is this **skill** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
Skills	
13. **Operation and Maneuvering of Helicopter**—adjusting altitude; maintaining airspeed; changing flight direction; performing flight hover maneuvers; flight control precision; recognition of flight parameters	⓪ ① ② ③ ④
14. **Operation of Communication Systems and Equipment**—radio/aircraft systems; intercom communication systems	⓪ ① ② ③ ④
15. **Operation of Navigation Systems and Equipment**—electronic systems; navigation radio; homing; VOR; NDB; ILS; GPS; LORAN; DME	⓪ ① ② ③ ④
16. **Operation of Sensor/Tracking Systems and Equipment**—lasers, illuminators, fire control radar	⓪ ① ② ③ ④
17. **Operation of Weapon Systems and Equipment**—hellfire missile system; air-to-air stinger system; rocket system	⓪ ① ② ③ ④
18. **Performance of Aircraft Operational Checks**— aircraft security checks; engine checks; run-up and taxi checks; before take-off and hover checks; cruise checks; climb checks	⓪ ① ② ③ ④

	Importance How important is this **ability** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
Abilities	
19. **Situational Awareness**—to accurately perceive self, others, and aircraft in relation to the environment	⓪ ① ② ③ ④
20. **Psychomotor Ability: Control Precision** – to make highly controlled and precise adjustments in moving the controls of an aircraft precisely and repeatedly (e.g., making precise adjustments of directional control pedals)	⓪ ① ② ③ ④
21. **Psychomotor Ability: Multi-limb Coordination** – to coordinate movements of two or more limbs at once (e.g., two arms, one leg and one arm)	⓪ ① ② ③ ④
22. **Psychomotor Ability: Simple Reaction Time** – to give a fast response to a signal when it appears	⓪ ① ② ③ ④
23. **Psychomotor Ability: Choice Reaction Time** – to choose between two or more movements quickly and correctly when there is more than one choice	⓪ ① ② ③ ④
24. **Psychomotor Ability: Rate Control** – to adjust an equipment control in response to changes in the speed or direction of a continuously moving object or scene, (e.g., keeping aircraft at a given altitude in turbulent weather or tracking a moving target)	⓪ ① ② ③ ④
25. **Perceptual Speed and Accuracy**—to perceive and process visual information quickly and accurately; to notice subtle visual details	⓪ ① ② ③ ④
26. **Oral Communication**—to speak in a clear, concise and persuasive manner; to give clear directions and information; to ask questions to clarify and ensure understanding	⓪ ① ② ③ ④

	Importance How important is this **ability** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
27. **Oral Comprehension**—to listen to and understand information and ideas that are presented orally	⓪ ① ② ③ ④
28. **Written Communication**—to write in a logical, well-organized manner; to use correct punctuation and grammar	⓪ ① ② ③ ④
29. **Reading Comprehension**—to perceive and understand principles governing the use of verbal concepts and symbols; to interpret meaning from written information	⓪ ① ② ③ ④
30. **Mathematical Ability**—to understand and apply basic (e.g., addition, rounding) and advanced (e.g., algebra) math principles; arithmetic reasoning	⓪ ① ② ③ ④
31. **Mechanical Comprehension**—to perceive physical relationships and practical problems in mechanics; to understand the operation of mechanical equipment	⓪ ① ② ③ ④
32. **Analytical Ability**—to reason logically and critically to draw correct, well-supported, and consistent conclusions	⓪ ① ② ③ ④
33. **Planning**—to develop courses of action to accomplish objectives and avoid potential problems; to manage activities effectively; to actively prepare for high workload/problem situations	⓪ ① ② ③ ④
34. **Organization/Time Management**—to prioritize activities and determine which ones require immediate attention; to manage and allocate time effectively	⓪ ① ② ③ ④

	Importance How important is this **ability** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
35. **Judgment/Decision-Making/Problem Solving**—to make high quality and timely decisions; to determine the appropriate course(s) of action given a set of alternatives; to assess the level of risk associated with a given course of action; to recognize when additional information is required to make a decision or solve a problem; to identify potential and/or novel solutions to problems; to anticipate the consequences of decisions	⓪ ① ② ③ ④
36. **Spatial Visualization and Orientation Ability**—to recognize and distinguish shapes and patterns; to identify an object at different angles; to anticipate a moving object's spatial orientation over time; to recognize one's own physical orientation in an unfamiliar environment; to estimate location after traveling for a period of time; to read a map and understand it's content	⓪ ① ② ③ ④
37. **Information Processing Ability: Divided Attention**—to pay attention to multiple tasks occurring at the same time	⓪ ① ② ③ ④
38. **Information Processing Ability: Selective/Focused Attention**—to focus on and process information related to a single task amid the presence of competing information or background noise	⓪ ① ② ③ ④
39. **Information Processing Ability: Working Memory** – to temporarily hold information in memory, use it while performing ongoing tasks, and update it continually to reflect the current situation	⓪ ① ② ③ ④
40. **Information Processing Ability: Long-Term Memory**—to remember information for long periods of time; to recall information that was learned some time ago	⓪ ① ② ③ ④
41. **Time Estimation**—to accurately estimate time intervals; tendency to be aware of timeline, especially during missions	⓪ ① ② ③ ④

	Importance How important is this **ability** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
42. **Learning**—to acquire knowledge and apply it to new situations	⓪ ① ② ③ ④
43. **Vigilance**—to stay alert and be attentive to one's surroundings, including small details; to recognize hazards and threats within one's environment; to perform repetitive tasks effectively	⓪ ① ② ③ ④
44. **Cognitive Task Prioritization**—to properly pay attention to tasks in order to achieve subgoals which support the overall mission goal; that is, ensure the pilot is "doing what he or she should be doing at all times"	⓪ ① ② ③ ④

	Importance How important is this **characteristic** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
Other Characteristics	
45. **Friendliness**—demonstrate appropriate level of affection and friendship; tendency to form relationships with others and seek out and enjoy the company of others	⓪ ① ② ③ ④
46. **Assertiveness**—tendency to act in an appropriately bold and energetic fashion in order to accomplish objectives; tendency to take control of situations or groups, without being overbearing	⓪ ① ② ③ ④
47. **Energy Level**—tendency to consistently exhibit a high level of energy and enthusiasm without being overly energetic or restless	⓪ ① ② ③ ④
48. **Excitement-Seeking**—tendency to crave excitement and stimulation, but not to the point of being reckless	⓪ ① ② ③ ④
49. **Positive Emotions**—tendency to experience positive emotions such as joy, happiness, and excitement	⓪ ① ② ③ ④
50. **Dominance**—tendency to seek out and enjoy positions of leadership and influence over others	⓪ ① ② ③ ④
51. **Work Ethic**—tendency to strive for competence in one's work; willingness to work long hours when appropriate; tendency to reliably complete one's work in a timely fashion	⓪ ① ② ③ ④
52. **Initiative**—tendency to take personal initiative in accomplishing tasks and to see tasks through until their completion	⓪ ① ② ③ ④
53. **Self-Confidence**—being sure of one's abilities without being over-confident or arrogant	⓪ ① ② ③ ④
54. **Straightforwardness**—tendency to be frank, sincere, and genuine	⓪ ① ② ③ ④

	Importance How important is this **characteristic** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
55. **Helpfulness**—tendency to have an active concern for others' welfare; expressed through generosity, consideration of others, and a willingness to assist others in need of help	⓪ ① ② ③ ④
56. **Empathy**—tendency to be moved by and sympathetic toward the needs of others without being overly sensitive	⓪ ① ② ③ ④
57. **Teamwork**—tendency to function effectively as part of a team; to cooperate with other crewmembers to accomplish goals and solve problems	⓪ ① ② ③ ④
58. **Followership**—tendency to follow requests or orders; to accept suggestions and guidance from other crewmembers without being defensive	⓪ ① ② ③ ④
59. **Interpersonal Relations**—tendency to understand and deal effectively with a variety of people; to treat others with courtesy and respect; to be considerate of others' needs	⓪ ① ② ③ ④
60. **Competence**—sense that one is capable and sensible, and feels well prepared to deal with life	⓪ ① ② ③ ④
61. **Order**—tendency to be neat, tidy, and well-organized	⓪ ① ② ③ ④
62. **Dutifulness**—tendency adhere to one's set of ethical principals and to strictly follow rules and regulations	⓪ ① ② ③ ④
63. **Achievement Striving**—tendency to set ambitious goals for oneself and to work hard to attain a high level of pilot proficiency	⓪ ① ② ③ ④
64. **Self Discipline**—tendency to control one's conduct and impulses	⓪ ① ② ③ ④

	Importance How important is this **characteristic** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
65. **Deliberation**—tendency to think carefully before acting, time permitting	⓪ ① ② ③ ④
66. **Dependability**—tendency to be reliable, planful, well-organized, disciplined, and determined	⓪ ① ② ③ ④
67. **Responsibility**—tendency to assume responsibility and accept consequences of own decisions and actions	⓪ ① ② ③ ④
68. **Perseverance**—tendency to stick with a task until completion in spite of obstacles	⓪ ① ② ③ ④
69. **Integrity**—tendency to behave in a moral or ethical manner	⓪ ① ② ③ ④
70. **Patriotism**—tendency to take a great deal of pride in, and loyalty to, one's country or nation	⓪ ① ② ③ ④
71. **Emotional Stability: Lack of Anxiety**—tendency to **NOT** be apprehensive, fearful, prone to worry, or tense	⓪ ① ② ③ ④
72. **Emotional Stability: Lack of Angry Hostility**—tendency to **NOT** experience anger or related states such as frustration and bitterness	⓪ ① ② ③ ④
73. **Emotional Stability: Lack of Depression**—tendency to **NOT** experience depressive emotions (e.g., feelings of guilt, sadness, hopelessness, and loneliness)	⓪ ① ② ③ ④
74. **Emotional Stability: Lack of Self-Consciousness**—tendency to **NOT** feel uncomfortable around others, to **NOT** be sensitive to ridicule, and to **NOT** be prone to feelings of inferiority	⓪ ① ② ③ ④
75. **Emotional Stability: Lack of Impulsiveness**—ability to control cravings and urges	⓪ ① ② ③ ④

	Importance How important is this **characteristic** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
76. **Emotional Stability: Lack of Vulnerability**—tendency to feel able to cope with stress; to **NOT** become dependent or panicked when confronted with emergency situations	⓪ ① ② ③ ④
77. **Stress Tolerance**—tendency to maintain composure in challenging and threatening situations	⓪ ① ② ③ ④
78. **Adaptability/Flexibility**—tendency to adjust easily to changing situations or conditions; to quickly adapt and change priorities when needed	⓪ ① ② ③ ④
79. **Creativity**—tendency to have a vivid imagination	⓪ ① ② ③ ④
80. **Openness to Experience**—behavioral willingness to try different activities and experience new places and things	⓪ ① ② ③ ④
81. **Openness to Ideas**—interest in pursuit of intellectual interests; a willingness to consider new or unconventional ideas	⓪ ① ② ③ ④
82. **Learning Orientation**— tendency to seek out and acquire new knowledge; natural curiosity about how things function in one's environment	⓪ ① ② ③ ④
83. **Interpersonal Tolerance**—tendency to be receptive to and tolerant of others who come from a very different background or have very different values, beliefs, or cultural practices	⓪ ① ② ③ ④
84. **Control**—belief that one has high levels of control over what happens in one's life and the rewards and punishments one receives	⓪ ① ② ③ ④
85. **Resourcefulness**—tendency to use one's resources both creatively and effectively to accomplish tasks	⓪ ① ② ③ ④

	Importance How important is this **characteristic** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
86. **Leadership: Delegation**—preference for assigning tasks and giving orders to others	⓪ ① ② ③ ④
87. **Leadership: Goals**—predisposition to communicate performance expectations to crewmembers	⓪ ① ② ③ ④
88. **Leadership: Performance Management**—predisposition to monitor crewmember performance and take action when performance is substandard; to inform crewmembers of mistakes or potential problems; to provide performance feedback and coaching to crewmembers as necessary; motivate crewmembers	⓪ ① ② ③ ④
89. **Leadership: Resolving Conflicts**—to resolve conflict among crewmembers; to foster an environment of teamwork and camaraderie	⓪ ① ② ③ ④
90. **Risk-Tolerance**—willingness to accept risk and engage in activities that involve a lack of certainty or fear of failure, but without being reckless	⓪ ① ② ③ ④
91. **Attention to Detail**—tendency to keep track of details; to notice even subtle changes or inconsistencies in a person or situation	⓪ ① ② ③ ④
92. **Involvement in Athletics & Physical Conditioning**—tendency to be active and participate in sports, exercise and physical activity	⓪ ① ② ③ ④
Please use this area to write in additional KSAOs that you believe were not represented above:	
	⓪ ① ② ③ ④
	⓪ ① ② ③ ④

	Importance How important is this **characteristic** to effective performance as an aviator? 0 = Not Important 1 = Somewhat Important 2 = Important 3 = Very Important 4 = Crucial
	⓪ ① ② ③ ④
	⓪ ① ② ③ ④
	⓪ ① ② ③ ④
	⓪ ① ② ③ ④
	⓪ ① ② ③ ④
	⓪ ① ② ③ ④

Appendix C

Informed Consent Form

INTRODUCTION: This project is titled Development of a Selection Instrument for Army Flight Training. This work is being conducted by Personnel Decisions Research Institutes, Inc. under contract to ARI. The purpose of this workshop is to obtain information about the importance of certain tasks, knowledge, skills, and abilities to effective helicopter pilot performance. The objective of the project is to develop a new measure to be used to select Soldiers for Army aviation training.

DISCLOSURE: You will be asked to complete a questionnaire that will ask you to rate the importance of tasks related to helicopter aviation and knowledges, skills, abilities, and other attributes related to being an effective aviator.

RISK: No physical or emotional risks have been identified in this research protocol. The level of stress generated by participation in this research is expected to be minimal. There are no hidden measures or hidden purposes within this research, nor is there any deception used in this research protocol.

CONFIDENTIALITY: All information will be kept in strictest confidence. Only group summary results will ever be discussed or reported. No personally identifiable information will be used in reporting results of this project to any agency, either within or outside the US Army. Individuals and units participating in this research will remain anonymous. YOU HAVE THE RIGHT TO REFUSE TO PROVIDE ANY OR ALL INFORMATION WITHOUT RISK OF ANY NEGATIVE CONSEQUENCE TO YOU. This right is protected under provisions of AR 70-25 Use of Volunteers as Subjects of Research.

ACKNOWLEDGMENT: By signing below I acknowledge that I have been informed that I have the right to refuse to provide any or all information asked of me. I further acknowledge that I have been informed that any and all information that I choose to provide will be kept anonymous.

_____

Signature Date

POINT OF CONTACT: Dr. William R. Howse
ARI-RWARU
DAPE-ARI-IR
BLDG 5100
FORT RUCKER AL 36362-5354
334-255-3686 dsn 558-3686

[DATA COLLECTION KEEPS ONE COPY. PARTICIPANT KEEPS ONE COPY.]

Appendix D

Task Rating Descriptive Statistics

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Planning	3.92	0.62	4.08	0.63	3.83	0.66	3.74	0.56	4.03	0.61
1. Gather information and materials to prepare for mission planning	4.11	0.87	4.17	0.90	3.95	0.92	4.07	0.86	4.19	0.82
2. Check status of aircraft	4.16	1.01	4.00	1.21	4.09	0.94	4.27	0.95	4.21	0.95
3. Plan VFR flight	3.88	0.88	4.16	0.88	3.66	0.86	3.67	0.85	4.01	0.86
4. Plan IFR flight	3.28	1.41	3.56	1.25	3.41	1.15	2.00	1.43	4.07	0.84
5. Perform tactical flight mission planning using the factors of METT-TC (mission, enemy, terrain/weather, troops, time, and civilians) to determine relevant mission information (e.g., appropriate terrain flight modes, primary and alternate routes, amount of fuel required, ROE, weapons engagement, and overall mission risk)	4.32	0.89	4.41	0.86	4.34	0.91	4.25	0.95	4.28	0.87

[1] Overall sample sizes ranged from 197-212, AH-64 sample sizes ranged from 42-46, CH-47 sample sizes ranged from 40-44, OH-58 sample sizes ranged from 47-55, and UH-60 sample sizes ranged from 61-67.

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
6. Operate electronic mission planning station to select and enter appropriate flight and mission information	3.32	1.14	3.80	0.98	3.39	1.06	3.09	1.34	3.13	1.04
7. Verify aircraft performance planning using appropriate performance data charts to ensure aircraft performance limitations are in accordance with current environmental conditions	4.47	0.72	4.72	0.50	4.20	0.76	4.36	0.78	4.55	0.70
8. Conduct air mission briefing and rehearsal to explain crew member responsibilities and duties	3.67	1.00	3.78	1.09	3.61	1.02	3.69	0.92	3.63	1.00
9. Plan for contingency operations	3.68	0.99	3.76	0.95	3.59	1.04	3.51	1.09	3.84	0.90
10. Obtain and analyze weather briefing	4.36	0.78	4.50	0.62	4.09	1.00	4.44	0.66	4.36	0.77
Pre-flight	3.84	0.72	3.85	0.79	3.61	0.75	3.96	0.61	3.90	0.72
11. Conduct passenger briefing to ensure understanding of mission information and emergency procedures	3.16	1.45	2.61	1.99	2.86	1.19	3.38	1.38	3.55	1.03
12. Verify aircraft weight and balance using appropriate charts to ensure that CG and gross weight remain within aircraft limits	3.84	1.05	3.83	1.12	3.57	1.04	4.07	0.88	3.85	1.10

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
13. Perform a pre-flight inspection to identify aircraft and mission equipment discrepancies	4.36	0.79	4.35	0.74	4.34	0.83	4.53	0.72	4.25	0.86
14. Obtain and inspect appropriate aviation life support equipment (ALSE)	3.33	1.00	3.37	1.16	3.11	0.99	3.29	0.94	3.46	0.94
15. Obtain fuel samples to check for fuel contamination	3.50	1.17	3.63	1.14	3.25	1.28	3.55	1.02	3.52	1.25
16. Configure cockpit and mission equipment	3.95	0.92	4.15	0.87	3.73	0.90	4.05	0.85	3.87	1.00
17. Perform engine start through before-take-off checks	4.38	0.81	4.61	0.74	4.11	0.99	4.49	0.72	4.31	0.74
18. Ensure clearance of ground personnel, ground equipment and other aircraft	4.22	0.95	4.24	0.99	3.86	0.98	4.29	0.92	4.37	0.88
In-flight – Take-off	3.99	0.72	4.22	0.69	3.75	0.78	3.86	0.69	4.08	0.67
19. Perform aircraft survivability equipment (ASE) operational checks	3.74	1.07	4.04	0.94	3.91	0.91	3.27	1.35	3.81	0.86
20. Properly coordinate with air traffic control (ATC)	4.09	0.92	4.22	0.99	3.73	1.02	4.11	0.79	4.22	0.85
21. Perform before taxi checks	3.54	1.14	3.96	0.87	3.36	0.99	3.11	1.49	3.72	0.92
22. Perform ground or hover taxi to position aircraft as needed	3.94	0.97	4.13	0.96	3.68	1.05	3.91	0.97	4.00	0.90

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
23. Perform before-take-off and hover checks to evaluate aircraft performance and systems	4.22	0.80	4.54	0.69	3.67	0.87	4.25	0.70	4.33	0.75
24. Perform appropriate take-off (e.g., VMC, IMC, rolling, terrain, pinnacle, max performance)	4.25	0.81	4.43	0.72	3.91	0.96	4.24	0.74	4.36	0.75
25. Perform hovering flight	4.13	0.89	4.24	0.82	3.98	1.05	4.15	0.85	4.14	0.88
In-flight – En-route	4.00	0.63	4.21	0.61	3.83	0.72	3.90	0.59	4.04	0.59
26. Monitor flight instruments equipment and systems	4.07	0.85	4.11	0.93	3.91	0.86	4.22	0.79	4.03	0.83
27. Perform cross checks to evaluate performance of systems	4.04	0.84	4.22	0.90	3.93	0.79	4.07	0.81	3.97	0.86
28. Navigate using electronic systems and navigational radios to maintain flight position along planned route	4.00	1.00	4.11	0.96	3.82	0.90	3.96	1.23	4.06	0.87
29. Perform holding procedures	2.67	1.38	3.20	1.24	2.73	1.26	1.62	1.24	3.15	1.17
30. Perform unusual attitude recovery	4.12	0.98	4.41	0.75	3.82	1.13	4.02	1.01	4.21	0.95
31. When inadvertent IMC conditions are encountered, perform inadvertent IMC recovery procedures	4.67	0.64	4.70	0.59	4.45	0.76	4.73	0.65	4.76	0.55

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
32. Operate IFF system	3.92	1.02	4.28	0.83	3.91	0.96	3.62	1.21	3.91	0.93
33. Interpret system symbology displayed by night systems	3.42	1.49	4.69	0.51	2.77	1.43	3.25	1.64	3.13	1.36
34. During approach, perform go-round maneuver when a safe landing cannot be accomplished.	4.38	0.82	4.67	0.56	4.23	0.86	4.24	0.94	4.40	0.80
35. Perform flight navigation by pilotage	3.95	0.91	4.09	0.86	3.93	0.97	3.67	0.98	4.09	0.81
36. Perform flight navigation by dead reckoning	3.79	1.02	3.91	0.98	3.86	1.03	3.29	1.07	4.06	0.87
37. Perform terrain flight maneuvers	4.26	0.78	4.30	0.73	4.00	0.94	4.42	0.74	4.28	0.71
38. Perform flight deceleration to reduce airspeed or attain a full stop	3.87	0.94	4.07	0.90	3.64	0.99	4.04	0.90	3.76	0.92
39. Perform standard or steep turns (ascending, descending, level) to place aircraft in the desired heading and altitude	3.92	0.92	4.07	0.88	3.66	1.01	3.98	0.91	3.93	0.89
40. Perform straight-and-level flight while maintaining heading and altitude	3.82	0.90	4.02	0.95	3.75	0.89	3.71	0.85	3.82	0.89
41. Perform climbs to maneuver aircraft to appropriate altitude	3.74	0.94	3.98	0.98	3.57	0.95	3.67	0.90	3.73	0.91

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
42. Perform descents to maneuver aircraft to appropriate altitude	3.73	0.93	3.98	0.98	3.57	0.95	3.67	0.88	3.72	0.90
43. Perform unusual attitude recovery	4.26	0.89	4.50	0.69	4.00	1.09	4.15	0.87	4.34	0.84
44. Perform evasive maneuvers consistent with the type of threat encountered	4.38	0.91	4.57	0.65	4.05	0.99	4.35	1.14	4.51	0.75
45. Perform actions on contact	4.27	0.93	4.46	0.72	4.07	1.04	4.27	1.06	4.28	0.87
46. Perform masking to protect the aircraft from enemy visual and electronic detection and unmask as needed	3.91	1.24	4.39	0.95	3.27	1.45	4.07	1.20	3.87	1.13
47. Perform ECM/ECCM procedures	3.38	1.25	3.89	0.99	3.35	1.45	3.16	1.20	3.24	1.23
48. Conduct airspace surveillance to detect air traffic or obstacles	4.26	0.99	4.39	0.88	4.00	0.99	4.11	1.20	4.46	0.80
49. Negotiate wire obstacles to ensure obstacle avoidance and aircraft clearance	4.38	0.80	4.39	0.77	4.14	0.88	4.49	0.74	4.45	0.80
50. Operate aircraft using night vision goggles	4.33	0.95	4.00	1.01	4.30	0.77	4.42	1.20	4.51	0.70
51. Perform fuel management procedures	4.13	0.87	3.98	1.00	4.25	0.81	4.16	0.76	4.12	0.90
52. Perform aircraft emergency procedures	4.79	0.53	4.87	0.40	4.79	0.47	4.78	0.57	4.75	0.61

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
53. Perform cruise checks to evaluate performance of systems	3.51	1.04	3.74	1.00	3.68	0.93	3.15	1.11	3.54	1.02
Landing	3.67	0.73	3.87	0.76	3.47	0.72	3.55	0.68	3.75	0.72
54. Perform before-landing check	3.60	0.98	4.02	0.88	3.41	0.97	3.47	0.90	3.55	1.06
55. Conduct landing area reconnaissance	3.75	0.95	3.93	1.00	3.44	0.98	3.91	0.82	3.70	0.95
56. Perform appropriate VMC approach and landing	3.95	0.90	4.17	0.80	3.70	0.98	3.85	0.91	4.03	0.87
57. Perform appropriate IFR approach	3.54	1.36	3.67	1.10	3.77	1.09	2.58	1.75	4.09	0.81
58. Apply appropriate environmental considerations based on type of landing area (e.g., rough terrain, smooth terrain, deck, sand, dust, snow)	4.33	0.80	4.41	0.80	4.23	0.91	4.31	0.79	4.36	0.73
59. Perform slope operations	3.86	0.87	4.00	0.89	3.75	0.87	4.00	0.77	3.73	0.91
60. Interpret hand and arm signals to safely maneuver aircraft	2.63	1.08	2.89	1.06	2.02	0.95	2.69	1.07	2.79	1.05
Post-Flight	3.35	0.96	3.61	0.93	3.04	1.09	3.42	0.90	3.32	0.91
61. Perform or monitor FARP operations	3.39	1.19	3.65	1.02	2.77	1.36	3.78	1.15	3.29	1.06

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
62. Perform after-landing through engine shutdown checks	3.70	0.98	3.89	1.02	3.48	1.02	3.75	0.87	3.68	0.99
63. Perform aircraft security check after the last flight of the day	2.96	1.23	3.28	1.28	2.84	1.23	2.75	1.21	3.00	1.18
Air Crew Coordination - Internal	4.04	0.71	4.08	0.78	3.87	0.74	4.10	0.72	4.07	0.64
64. Ensure crewmembers have information to complete mission objectives	4.13	0.85	4.24	0.97	3.80	0.90	4.09	0.84	4.30	0.66
65. Coordinate and direct crewmember tasks in order to accomplish collective tasks	4.00	0.83	4.07	0.93	3.89	0.84	4.00	0.79	4.02	0.79
66. Designate duties and responsibilities to crew members to accomplish mission tasks	3.98	0.87	4.04	0.92	3.91	0.77	3.95	0.93	4.02	0.85
67. Direct and/or offer assistance to crewmembers as needed	4.11	0.82	4.07	0.90	4.02	0.85	4.20	0.85	4.12	0.73
68. Cross-monitor crewmembers actions and decisions to reduce likelihood of errors	4.10	0.83	4.09	0.89	4.00	0.84	4.20	0.80	4.11	0.81
69. Facilitate information flow among crewmembers to keep crewmembers informed of relevant events and information	4.07	0.86	4.04	0.97	3.95	0.86	4.19	0.80	4.08	0.85

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
70. Resolve flight-related problems as they arise to ensure mission safety and completion	4.23	0.85	4.22	0.76	4.05	0.91	4.30	0.96	4.30	0.76
71. Maintain aircrew situational awareness and common frame of reference by announcing mission-critical information to crewmembers	4.27	0.80	4.37	0.74	4.05	0.83	4.35	0.87	4.29	0.74
72. Participate in after-action review to constructively review mission with crewmembers	3.61	1.00	3.72	1.11	3.34	0.91	3.78	0.98	3.58	0.96
73. Apply "lessons learned" from after-action review in subsequent missions	3.92	0.93	4.00	0.97	3.70	0.98	3.98	0.92	3.97	0.88
Air Crew Coordination – External	3.69	0.94	3.80	0.93	3.31	0.91	3.97	0.93	3.63	0.90
74. Operate and monitor radios (data and voice) to communicate with Tactical Operations Center (TOC) and other units or stations	3.84	1.00	3.87	0.98	3.66	0.89	3.93	1.15	3.88	0.95
75. Transmit tactical reports	3.53	1.11	3.74	0.98	2.95	1.18	4.02	1.07	3.38	0.99
Reconnaissance	2.96	1.39	3.70	0.82	1.87	1.06	3.96	1.04	2.35	1.32
76. Identify major US or allied equipment and major threat equipment in the area of operations	3.78	1.20	4.48	0.62	3.05	1.46	4.07	1.04	3.53	1.11

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
77. Conduct reconnaissance (zone, area, route) to identify natural/manmade features within specific boundaries and routes for elements, such as trails, bridges, etc.	2.89	1.60	3.52	0.94	1.81	1.55	3.93	1.13	2.30	1.65
78. Perform aerial observation to detect, identify, locate and report using stationary and motive techniques	2.93	1.64	3.65	0.95	1.86	1.30	4.17	1.08	2.11	1.68
79. Call for and adjust fire	2.58	1.64	3.46	1.09	1.23	1.13	3.70	1.30	1.92	1.52
80. Conduct route reconnaissance to identify detailed information about a specific route (including adjacent terrain usability), especially where the enemy could influence movement	2.67	1.69	3.37	1.14	1.40	1.40	3.94	1.14	1.97	1.62
Lift	1.74	1.54	0.31	0.94	2.61	0.75	0.43	1.08	2.99	0.90
81. Perform internal load operations	2.32	1.97	0.29	0.92	4.00	0.86	0.60	1.31	3.69	0.97
82. Perform external load operations	2.57	2.16	0.43	1.13	4.50	0.90	0.51	1.38	4.09	0.81
83. Perform Rappelling/FRIES procedures	1.52	1.62	0.29	0.92	1.93	1.39	0.40	1.08	2.79	1.32
84. Perform STABO/SPIES operations	1.46	1.59	0.31	1.02	1.77	1.29	0.40	1.08	2.73	1.32
85. Perform rescue-hoist operations	1.84	1.76	0.29	0.92	2.68	1.27	0.40	1.12	3.27	1.16

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
86. Perform paradrop operations	1.58	1.61	0.29	0.92	2.86	1.25	0.34	0.92	2.42	1.30
87. Perform volcano operations	0.91	1.33	0.29	0.92	0.52	1.00	0.34	0.92	1.96	1.38
Attack	2.17	1.91	4.08	0.61	0.55	1.22	3.22	1.25	0.97	1.55
88. Perform aerial observation	2.51	1.89	3.67	0.97	1.45	1.81	3.72	1.47	1.38	1.67
89. Perform ABF operations to engage target	2.19	2.06	4.39	0.74	0.45	1.34	3.22	1.37	0.86	1.54
90. Employ appropriate weapon system to engage target	2.51	2.23	4.61	0.65	0.93	1.82	3.76	1.53	0.98	1.76
91. Perform appropriate firing techniques	2.47	2.25	4.57	0.58	0.70	1.68	3.86	1.55	0.97	1.76
92. Engage target with rocket system	2.37	2.27	4.67	0.63	0.35	1.25	3.78	1.56	0.84	1.65
93. Engage target with missile system	2.39	2.28	4.76	0.52	0.35	1.25	3.78	1.56	0.84	1.65
94. Engage target with gun system	1.57	2.16	3.74	1.95	0.35	1.25	1.47	2.08	0.84	1.65
95. Engage target with ATAS	1.27	1.84	2.09	2.21	0.35	1.25	1.84	1.68	0.83	1.61
96. Designate target with appropriate aircraft system	2.31	2.22	4.57	0.62	0.35	1.25	3.68	1.54	0.83	1.61
97. Track target with appropriate aircraft system	2.32	2.24	4.61	0.61	0.33	1.19	3.72	1.58	0.81	1.58
98. Call for a tactical air strike	2.18	1.83	3.65	0.85	0.63	1.39	3.12	1.41	1.33	1.65

Task Rating Descriptive Statistics[1]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
99. Perform artillery call for fire	2.32	1.89	3.67	0.97	0.80	1.45	3.46	1.50	1.38	1.67
100. Perform target handover	2.28	2.07	4.28	0.69	0.35	1.12	3.52	1.36	1.03	1.70
101. Perform SCAS-OFF/BUCS-ON Flight	1.77	1.85	3.83	1.00	0.38	1.17	2.10	1.33	0.85	1.63

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Knowledges										
1. **Unit/Command Objectives**—e.g., unit's function and operations; METL, air mission briefs and commander's intent	2.74	0.93	3.00	0.89	2.59	0.92	2.85	0.88	2.58	0.96
2. **Aviation Principals**—e.g., fundamentals of flight; force; gravity; speed; velocity; distance; motion; altitude, direction; object rotation; geography/terrain	2.79	0.90	2.74	1.02	2.77	0.89	2.69	0.84	2.93	0.86
3. **Basic Operation Procedures**—e.g., loading/unloading procedures for internal and external load operation; cockpit equipment operation; emergency procedures; safety procedures; post-flight checks	3.23	0.86	3.15	0.89	3.20	0.79	3.31	0.89	3.22	0.87

[2] Overall sample sizes ranged from 209-211, AH-64 sample sizes ranged from 45-46, CH-47 sample sizes ranged from 43-44, OH-58 sample sizes ranged from 53-54, and UH-60 sample sizes ranged from 65-67. There was one exception, however, due to a printing error the "bubbles" for Item 41 – Time Estimation, did not print properly causing many respondents to skip this item. Thus, for Item 41, the overall sample size was 115, the AH-64 sample size was 21, the CH-47 sample size was 33, the OH-58 sample size was 26 and the UH-60 sample size was 35.

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
4. **Aircraft Systems Operations**—e.g., navigation; sensors; weapons	3.31	0.77	3.50	0.72	3.14	0.73	3.43	0.74	3.19	0.80
5. **Communication Procedures**—e.g., radio, data, intercom operation; system display indicator operation; tactical report transmission; crew coordination	3.20	0.75	3.24	0.71	3.02	0.85	3.37	0.68	3.15	0.76
6. **Threat Categories and Indicators**—e.g., types of enemy systems; warning and detection systems; identification	2.80	0.94	3.24	0.67	2.59	1.02	2.83	0.95	2.61	0.95
7. **Reconnaissance Procedures**—e.g., scanning assigned sectors; aerial observation; route, zone, and area reconnaissance	2.42	1.18	2.80	0.78	1.75	1.10	3.22	0.82	1.96	1.25
8. **Engagement Procedures**—e.g., weapons control measures; firing position operations; weapons initialization; weapon system operation; masking and unmasking; target handover procedures	2.56	1.43	3.59	0.65	1.50	1.28	3.50	0.75	1.81	1.40

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
9. **Meteorology**—e.g., ambient light; clouds and precipitation; forces and winds; air masses and fronts; weather forecasting; storms; effects of weather on aircraft operations	2.96	0.77	2.96	0.76	2.98	0.79	2.98	0.81	2.94	0.76
10. **Aeronautical Terminology**—e.g., principles and practices of navigation; aviation phraseology; standard crew terminology	2.89	0.80	2.85	0.79	2.60	0.85	2.85	0.76	3.12	0.75
11. **Operational Terms and Graphics**—e.g., chart and map reading, topography, symbology	2.81	0.88	2.57	0.91	2.68	0.83	2.87	0.89	3.01	0.86
12. **Flight Rules and Regulations**—e.g., civil, military, and unit specific regulations (SOP)	3.26	0.74	3.15	0.82	3.07	0.82	3.31	0.72	3.40	0.63

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Skills										
13. **Operation and Maneuvering of Helicopter**—adjusting altitude; maintaining airspeed; changing flight direction; performing flight hover maneuvers; flight control precision; recognition of flight parameters	3.63	0.58	3.70	0.51	3.41	0.76	3.69	0.51	3.69	0.53
14. **Operation of Communication Systems and Equipment**—radio/aircraft systems; intercom communication systems	3.09	0.79	3.24	0.71	2.75	0.89	3.39	0.66	2.96	0.77
15. **Operation of Navigation Systems and Equipment**—electronic systems; navigation radio; homing; VOR; NDB; ILS; GPS; LORAN; DME	3.05	0.84	3.07	0.85	2.86	0.88	3.02	0.98	3.19	0.63
16. **Operation of Sensor/Tracking Systems and Equipment**—lasers, illuminators, fire control radar	2.29	1.48	3.61	0.65	1.30	1.34	2.93	1.04	1.49	1.33
17. **Operation of Weapon Systems and Equipment**—hellfire missile system; air-to-air stinger system; rocket system	2.25	1.64	3.70	0.59	0.93	1.33	3.15	1.00	1.38	1.54

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
18. **Performance of Aircraft Operational Checks**— aircraft security checks; engine checks; run-up and taxi checks; before take-off and hover checks; cruise checks; climb checks	3.15	0.78	3.41	0.65	2.86	0.88	3.19	0.73	3.13	0.80
Abilities										
19. **Situational Awareness**—to accurately perceive self, others, and aircraft in relation to the environment	3.76	0.52	3.80	0.45	3.52	0.70	3.89	0.32	3.78	0.52
20. **Psychomotor Ability: Control Precision** – to make highly controlled and precise adjustments in moving the controls of an aircraft precisely and repeatedly (e.g., making precise adjustments of directional control pedals)	3.31	0.72	3.39	0.65	3.07	0.93	3.33	0.70	3.40	0.60
21. **Psychomotor Ability: Multi-limb Coordination** – to coordinate movements of two or more limbs at once (e.g., two arms, one leg and one arm)	3.49	0.67	3.63	0.53	3.16	0.81	3.52	0.64	3.58	0.63

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
22. **Psychomotor Ability: Simple Reaction Time** – to give a fast response to a signal when it appears	3.19	0.73	3.26	0.68	2.93	0.79	3.35	0.70	3.19	0.70
23. **Psychomotor Ability: Choice Reaction Time** – to choose between two or more movements quickly and correctly when there is more than one choice	3.34	0.67	3.33	0.67	3.18	0.76	3.46	0.66	3.36	0.62
24. **Psychomotor Ability: Rate Control** – to adjust an equipment control in response to changes in the speed or direction of a continuously moving object or scene, (e.g., keeping aircraft at a given altitude in turbulent weather or tracking a moving target)	3.14	0.75	3.28	0.69	2.82	0.92	3.26	0.62	3.15	0.70
25. **Perceptual Speed and Accuracy**—to perceive and process visual information quickly and accurately; to notice subtle visual details	3.29	0.71	3.30	0.70	3.05	0.83	3.43	0.63	3.33	0.66

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
26. **Oral Communication**—to speak in a clear, concise and persuasive manner; to give clear directions and information; to ask questions to clarify and ensure understanding	3.19	0.76	3.22	0.70	2.95	0.86	3.31	0.64	3.22	0.81
27. **Oral Comprehension**—to listen to and understand information and ideas that are presented orally	3.25	0.69	3.28	0.58	3.11	0.75	3.35	0.65	3.24	0.74
28. **Written Communication**—to write in a logical, well-organized manner; to use correct punctuation and grammar	2.18	0.94	2.22	0.94	2.23	1.05	2.19	0.75	2.10	1.00
29. **Reading Comprehension**—to perceive and understand principles governing the use of verbal concepts and symbols; to interpret meaning from written information	2.85	0.77	2.83	0.71	2.89	0.84	2.87	0.67	2.84	0.85
30. **Mathematical Ability**—to understand and apply basic (e.g., addition, rounding) and advanced (e.g., algebra) math principles; arithmetic reasoning	2.37	0.92	2.35	0.97	2.57	1.02	2.24	0.91	2.36	0.83

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
31. **Mechanical Comprehension**—to perceive physical relationships and practical problems in mechanics; to understand the operation of mechanical equipment	2.75	0.84	2.74	0.88	2.82	0.99	2.63	0.76	2.82	0.78
32. **Analytical Ability**—to reason logically and critically to draw correct, well-supported, and consistent conclusions	3.03	0.79	3.09	0.76	3.05	0.83	3.00	0.73	3.00	0.83
33. **Planning**—to develop courses of action to accomplish objectives and avoid potential problems; to manage activities effectively; to actively prepare for high workload/problem situations	3.13	0.71	3.04	0.71	3.16	0.75	3.11	0.72	3.18	0.69
34. **Organization/Time Management**—to prioritize activities and determine which ones require immediate attention; to manage and allocate time effectively	3.15	0.75	3.02	0.83	3.16	0.81	3.19	0.70	3.19	0.70

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
35. **Judgment/Decision-Making/Problem Solving**—to make high quality and timely decisions; to determine the appropriate course(s) of action given a set of alternatives; to assess the level of risk associated with a given course of action; to recognize when additional information is required to make a decision or solve a problem; to identify potential and/or novel solutions to problems; to anticipate the consequences of decisions	3.41	0.67	3.33	0.63	3.34	0.71	3.52	0.61	3.42	0.70
36. **Spatial Visualization and Orientation Ability**—to recognize and distinguish shapes and patterns; to identify an object at different angles; to anticipate a moving object's spatial orientation over time; to recognize one's own physical orientation in an unfamiliar environment; to estimate location after traveling for a period of time; to read a map and understand it's content	3.23	0.74	3.35	0.74	3.00	0.68	3.31	0.67	3.24	0.80

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
37. **Information Processing Ability: Divided Attention**—to pay attention to multiple tasks occurring at the same time	3.43	0.65	3.48	0.66	3.25	0.75	3.52	0.57	3.43	0.61
38. **Information Processing Ability: Selective/Focused Attention**—to focus on and process information related to a single task amid the presence of competing information or background noise	3.28	0.68	3.39	0.65	3.09	0.74	3.37	0.71	3.27	0.62
39. **Information Processing Ability: Working Memory** – to temporarily hold information in memory, use it while performing ongoing tasks, and update it continually to reflect the current situation	3.16	0.71	3.20	0.69	2.93	0.76	3.31	0.67	3.16	0.71
40. **Information Processing Ability: Long-Term Memory**—to remember information for long periods of time; to recall information that was learned some time ago	3.08	0.72	3.13	0.72	2.84	0.64	3.17	0.75	3.12	0.73
41. **Time Estimation**—to accurately estimate time intervals; tendency to be aware of timeline, especially during missions	2.91	0.91	2.76	1.04	3.03	0.92	2.85	0.83	2.94	0.91

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	**Mean**	***SD***	**Mean**	***SD***	**Mean**	***SD***	**Mean**	***SD***	**Mean**	***SD***
42. **Learning**—to acquire knowledge and apply it to new situations	3.10	0.71	3.15	0.67	2.98	0.70	3.20	0.68	3.06	0.76
43. **Vigilance**—to stay alert and be attentive to one's surroundings, including small details; to recognize hazards and threats within one's environment; to perform repetitive tasks effectively	3.35	0.71	3.33	0.70	3.07	0.76	3.61	0.60	3.33	0.70
44. **Cognitive Task Prioritization**—to properly pay attention to tasks in order to achieve subgoals which support the overall mission goal; that is, ensure the pilot is "doing what he or she should be doing at all times"	3.18	0.74	3.20	0.78	2.86	0.73	3.37	0.65	3.21	0.73
Other Characteristics										
45. **Friendliness**—demonstrate appropriate level of affection and friendship; tendency to form relationships with others and seek out and enjoy the company of others	1.78	0.98	1.48	0.96	2.05	1.01	1.70	0.82	1.87	1.04

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
46. **Assertiveness**—tendency to act in an appropriately bold and energetic fashion in order to accomplish objectives; tendency to take control of situations or groups, without being overbearing	2.61	0.78	2.61	0.74	2.52	0.76	2.65	0.78	2.64	0.81
47. **Energy Level**—tendency to consistently exhibit a high level of energy and enthusiasm without being overly energetic or restless	2.45	0.93	2.46	0.89	2.34	1.03	2.48	0.82	2.49	0.98
48. **Excitement-Seeking**—tendency to crave excitement and stimulation, but not to the point of being reckless	1.76	1.13	1.91	1.26	1.66	1.06	1.81	0.97	1.67	1.20
49. **Positive Emotions**—tendency to experience positive emotions such as joy, happiness, and excitement	2.11	1.05	1.93	1.16	2.18	0.99	2.13	1.05	2.16	1.02
50. **Dominance**—tendency to seek out and enjoy positions of leadership and influence over others	1.67	1.09	1.74	1.10	1.84	1.03	1.46	0.97	1.69	1.20

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
51. **Work Ethic**—tendency to strive for competence in one's work; willingness to work long hours when appropriate; tendency to reliably complete one's work in a timely fashion	3.12	0.74	3.26	0.71	3.09	0.68	3.09	0.78	3.07	0.77
52. **Initiative**—tendency to take personal initiative in accomplishing tasks and to see tasks through until their completion	3.16	0.71	3.33	0.67	2.93	0.76	3.23	0.61	3.15	0.74
53. **Self-Confidence**—being sure of one's abilities without being over-confident or arrogant	3.14	0.67	3.37	0.57	3.07	0.66	3.09	0.68	3.06	0.69
54. **Straightforwardness**—tendency to be frank, sincere, and genuine	2.93	0.88	3.13	0.83	2.77	0.87	3.00	0.80	2.85	0.96
55. **Helpfulness**—tendency to have an active concern for others' welfare; expressed through generosity, consideration of others, and a willingness to assist others in need of help	2.59	0.84	2.61	0.98	2.55	0.82	2.61	0.81	2.60	0.80

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
56. **Empathy**—tendency to be moved by and sympathetic toward the needs of others without being overly sensitive	1.80	0.95	1.70	1.03	1.95	0.83	1.76	0.91	1.79	1.01
57. **Teamwork**—tendency to function effectively as part of a team; to cooperate with other crewmembers to accomplish goals and solve problems	3.39	0.67	3.41	0.69	3.27	0.76	3.50	0.57	3.36	0.67
58. **Followership**—tendency to follow requests or orders; to accept suggestions and guidance from other crewmembers without being defensive	2.83	0.81	2.67	0.76	2.70	0.85	2.96	0.78	2.91	0.83
59. **Interpersonal Relations**—tendency to understand and deal effectively with a variety of people; to treat others with courtesy and respect; to be considerate of others' needs	2.52	0.91	2.35	1.04	2.55	0.87	2.67	0.78	2.52	0.95
60. **Competence**—sense that one is capable and sensible, and feels well prepared to deal with life	3.13	0.72	3.17	0.71	3.07	0.85	3.06	0.68	3.20	0.66

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
61. **Order**—tendency to be neat, tidy, and well-organized	2.27	0.92	1.98	1.04	2.32	0.88	2.44	0.84	2.30	0.89
62. **Dutifulness**—tendency adhere to one's set of ethical principals and to strictly follow rules and regulations	2.84	0.81	2.83	0.82	2.66	0.78	2.83	0.72	2.97	0.88
63. **Achievement Striving**—tendency to set ambitious goals for oneself and to work hard to attain a high level of pilot proficiency	2.92	0.75	2.93	0.68	2.80	0.73	2.89	0.77	3.02	0.79
64. **Self Discipline**—tendency to control one's conduct and impulses	3.21	0.70	3.35	0.74	3.00	0.78	3.26	0.62	3.23	0.65
65. **Deliberation**—tendency to think carefully before acting, time permitting	2.83	0.76	2.89	0.77	2.82	0.90	2.74	0.71	2.86	0.72
66. **Dependability**—tendency to be reliable, planful, well-organized, disciplined, and determined	3.19	0.72	3.30	0.73	3.00	0.84	3.19	0.68	3.23	0.67
67. **Responsibility**—tendency to assume responsibility and accept consequences of own decisions and actions	3.30	0.69	3.43	0.62	3.09	0.80	3.28	0.69	3.36	0.62

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
68. **Perseverance**—tendency to stick with a task until completion in spite of obstacles	3.06	0.76	3.28	0.75	2.82	0.76	3.07	0.72	3.06	0.76
69. **Integrity**—tendency to behave in a moral or ethical manner	3.37	0.75	3.35	0.79	3.23	0.89	3.46	0.61	3.39	0.72
70. **Patriotism**—tendency to take a great deal of pride in, and loyalty to, one's country or nation	3.05	0.88	3.22	0.84	3.05	1.06	3.04	0.78	2.95	0.85
71. **Emotional Stability: Lack of Anxiety**—tendency to **NOT** be apprehensive, fearful, prone to worry, or tense	2.79	0.80	2.87	0.81	2.64	0.75	2.87	0.70	2.76	0.91
72. **Emotional Stability: Lack of Angry Hostility**—tendency to **NOT** experience anger or related states such as frustration and bitterness	2.71	0.76	2.63	0.80	2.68	0.71	2.74	0.68	2.77	0.84
73. **Emotional Stability: Lack of Depression**—tendency to **NOT** experience depressive emotions (e.g., feelings of guilt, sadness, hopelessness, and loneliness)	2.77	0.84	2.72	0.86	2.73	0.85	2.80	0.74	2.82	0.91

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
74. **Emotional Stability: Lack of Self-Consciousness**—tendency to **NOT** feel uncomfortable around others, to **NOT** be sensitive to ridicule, and to **NOT** be prone to feelings of inferiority	2.80	0.84	2.80	0.91	2.75	0.87	2.87	0.73	2.79	0.87
75. **Emotional Stability: Lack of Impulsiveness**—ability to control cravings and urges	2.56	0.85	2.50	1.05	2.45	0.73	2.69	0.75	2.56	0.86
76. **Emotional Stability: Lack of Vulnerability**—tendency to feel able to cope with stress; to **NOT** become dependent or panicked when confronted with emergency situations	3.05	0.83	3.09	0.84	2.98	0.93	3.24	0.67	2.91	0.85
77. **Stress Tolerance**—tendency to maintain composure in challenging and threatening situations	3.24	0.65	3.20	0.62	3.11	0.75	3.33	0.58	3.29	0.65
78. **Adaptability/Flexibility**—tendency to adjust easily to changing situations or conditions; to quickly adapt and change priorities when needed	3.20	0.67	3.22	0.59	3.11	0.75	3.31	0.67	3.17	0.67

Appendix E

KSAO Rating Descriptive Statistics[2]

KSAOs	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
79. **Creativity**—tendency to have a vivid imagination	2.15	1.07	2.09	1.09	2.20	1.07	2.20	1.16	2.11	0.99
80. **Openness to Experience**—behavioral willingness to try different activities and experience new places and things	2.35	0.96	2.28	0.96	2.43	1.00	2.48	0.93	2.23	0.96
81. **Openness to Ideas**—interest in pursuit of intellectual interests; a willingness to consider new or unconventional ideas	2.49	0.89	2.43	0.81	2.57	0.95	2.67	0.80	2.33	0.95
82. **Learning Orientation**— tendency to seek out and acquire new knowledge; natural curiosity about how things function in one's environment	2.79	0.79	2.78	0.84	2.55	0.87	2.93	0.64	2.83	0.78
83. **Interpersonal Tolerance**—tendency to be receptive to and tolerant of others who come from a very different background or have very different values, beliefs, or cultural practices	2.53	0.91	2.37	0.95	2.59	0.73	2.63	0.94	2.52	0.98
84. **Control**—belief that one has high levels of control over what happens in one's life and the rewards and punishments one receives	2.47	0.99	2.37	1.04	2.55	0.93	2.48	0.99	2.47	1.01

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
85. **Resourcefulness**—tendency to use one's resources both creatively and effectively to accomplish tasks	2.79	0.79	2.80	0.83	2.55	0.79	2.93	0.72	2.83	0.80
86. **Leadership: Delegation**—preference for assigning tasks and giving orders to others	2.32	0.93	2.28	1.03	2.41	0.79	2.22	0.86	2.38	1.02
87. **Leadership: Goals**—predisposition to communicate performance expectations to crewmembers	2.52	0.85	2.57	0.96	2.48	0.79	2.46	0.86	2.58	0.80
88. **Leadership: Performance Management**—predisposition to monitor crewmember performance and take action when performance is substandard; to inform crewmembers of mistakes or potential problems; to provide performance feedback and coaching to crewmembers as necessary; motivate crewmembers	2.76	0.88	2.70	1.01	2.68	0.93	2.81	0.80	2.82	0.80
89. **Leadership: Resolving Conflicts**—to resolve conflict among crewmembers; to foster an environment of teamwork and camaraderie	2.76	0.83	2.63	1.00	2.60	0.76	2.81	0.80	2.91	0.76

Appendix E KSAO Rating Descriptive Statistics[2]										
	Entire Sample		By Airframe							
	All		AH-64		CH-47		OH-58		UH-60	
KSAOs	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
90. **Risk-Tolerance**—willingness to accept risk and engage in activities that involve a lack of certainty or fear of failure, but without being reckless	2.77	0.83	2.80	0.88	2.79	0.77	2.76	0.91	2.74	0.79
91. **Attention to Detail**—tendency to keep track of details; to notice even subtle changes or inconsistencies in a person or situation	3.22	0.72	3.13	0.78	3.05	0.75	3.31	0.64	3.33	0.69
92. **Involvement in Athletics & Physical Conditioning**—tendency to be active and participate in sports, exercise and physical activity	2.25	1.06	2.48	1.15	1.91	1.17	2.43	0.81	2.18	1.04